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FIRST-YEAR PROGRESS REPORT OF A PROJECT IN NURSERY SCHOOL EDUCATION FOR ENVIRONMENTALLY DEPRIVED SPANISH-AMERICAN CHILDREN.

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*MINORITY-GROUP CHILDREN, *NURSERY SCHOOLS, *ENRICHMENT PROGRAMS, *DISADVANTAGED YOUTH, PRESCHOOL CHILDREN, TESTING PROGRAMS, PRESCHOOL LEARNING, *PRESCHOOL EVALUATION, STANFORD-BINET TEST, PEABODY PICTURE VOCABULARY TESTS, GREELEY, COLORADO, DENVER

A NEW NURSERY SCHOOL PROGRAM, COMBINING A RESPONSIVE ENVIRONMENT AND AN ENRICHED CLASSROOM SUBPROGRAM, WAS IMPLEMENTED IN AN EFFORT TO IMPROVE PARTICULAR SKILLS, ABILITIES, AND PERSONALITY CHARACTERISTICS OF DISADVANTAGED SPANISH-AMERICAN, PRESCHOOL CHILDREN. FIRST-YEAR EFFORTS WERE REPORTED OF AN EXTENDED LONGITUDINAL STUDY, PROJECTED FOR ABOUT 10 YEARS. THE "STANFORD-BINET TEST" AND THE "PEABODY PICTURE VOCABULARY TEST" WERE ADMINISTERED TO 30 CHILDREN FROM FAMILIES DEPRIVED BY OCCUPATION, INCOME, AND EDUCATION. AFTER 1 YEAR OF SCHOOL ATTENDANCE THE GROUP WAS RETESTED. THEIR SCORES WERE COMPARED WITH THOSE OBTAINED FROM--(1) A MATCHED SPANISH-AMERICAN CONTROL GROUP WHICH DID NOT ATTEND NURSERY SCHOOL, (2) A GROUP OF "ANGLO" MIDDLE- AND UPPERCLASS CHILDREN IN A PARALLEL EXPERIMENTAL PROGRAM, AND (3) A GROUP OF COMPARABLE "ANGLO" CHILDREN IN A TRADITIONAL NURSERY SCHOOL PROGRAM. FINDINGS INDICATED SIGNIFICANT GAINS ON THE "PEABODY TEST" OF THE SPANISH-AMERICAN CHILDREN IN THE NEW NURSERY SCHOOL PROGRAM. SIGNIFICANT "STANFORD-BINET" GAINS BY THIS GROUP, HOWEVER, WERE NOT REALIZED AT THE TIME OF THIS REPORTING. IN ADDITION, LIMITED FOLLOWUP OF THIS GROUP SHOWED THEIR ACHIEVEMENT IN KINDERGARTEN TO BE SUPERIOR, ALLOWING FAVORABLE PROGNOSIS FOR THEIR SUCCESSFULLY COMPLETING THE FIRST GRADE. (JH)

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U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
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INTRODUCTION

A major educational and social problem in the United States today is this cycle: Children from disadvantaged families enter school without the experiences prerequisite for school success; they fall further and further behind other children, usually dropping out of school before achieving even functional literacy (the ability to read at the fifth grade level); then they return to their slum homes to rear the next disadvantaged generation. Breaking this cycle is the necessary antecedent to the solution of the related problems of discrimination, poverty, school drop-outs, mental retardation, emotional disturbance, unemployment, and juvenile delinquency. The major thesis of this proposal is that the cycle can and must be broken before the child enters the first grade.

Under the auspices of Colorado State College, an independent research and demonstration school opened in October of 1964, in Greeley, Colorado. The school enrolled thirty lower-class Spanish-American[1] children between

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[1]In the main, these children are Spanish and Indian. The designation Spanish-American or Mexican-American is used interchangeably by the general population, but the individuals involved make distinctions according to the family's origin. Some families came from Spain, settled in the Southwest when it was still under Mexican rule, and inter-married with the Indians; others settled first in Mexico and then moved to the United States. Regardless of origin, most individuals prefer to be called Spanish-American because of the derogatory way in which "Mexican" or "Mexican-American" has been used in the past. To simplify writing, we will refer to the group as Spanish-American.

the ages of three and five. Each of these children attended the New Nursery School three hours a day. Each child may spend up to twenty minutes a day in an autotelic responsive environment comprised essentially of an electric typewriter and a carefully trained booth assistant. The remainder of the child's three hours at the nursery school are spent in a general classroom.

At the New Nursery School, we have combined Professor Omar Khayyam Moore's responsive environment concept with Dr. Martin Deutsch's enriched nursery school program for economically and socially deprived children. The school also makes use of some techniques attributed to Maria Montessori.

Professor Moore discovered that normal three- to seven-year-old children could learn to read within a matter of weeks using an autotelic responsive environment, which he has defined as an environment satisfying the following conditions:

1. It permits the learner to explore freely.

2. It informs the learner immediately about the consequences of his actions.

3. It is self-pacing; i.e., events happen within the environment at a rate determined by the learner.

4. It permits the learner to make full use of his capacity for discovering relations of various kinds.

5. Its structure is such that the learner is likely to make a series of interconnected discoveries about the physical, cultural or social world.[2]

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[2]Omar Khayyam Moore, Autotelic Responsive Environments and Exceptional Children, Hamden, Connecticut: Responsive Environments Foundation, Inc., 20 Augur Street, September 1, 1963, p.2. For a detailed description of the Responsive Environments Laboratory and its procedures, see the remainder of this monograph. See also, Alan Ross Anderson and Omar Khayyam Moore, "Autotelic Folk-Models," The Sociological Quarterly, Vol. I, (1960).

The autotelic responsive environment places emphasis upon learning rather than upon teaching. The primary concern of such an environment is the interaction between the learner and a social, vital world. Thus, the environment responds to the actions of the learner, and, of course, the learner is limited by what he finds in the environment.

To apply this concept to the learning of language skills, Professor Moore devised an autotelic responsive environment that used an electric typewriter and a booth assistant. The learner is free to explore the environment, obtaining feedback from both the typewriter and the assistant. Later, Professor Moore and engineers of the Thomas A. Edison Research Laboratory developed the "talking typewriter," a totally automated responsive environment. However, in addition to the talking typewriter, Professor Moore continues to use the original responsive environment. Professor Moore's findings are clear: Responsive environments lead to exceedingly high achievement, and the time between three and six years of age can be used effectively to prepare children for formal academic work.[3]

Dr. Deutsch has worked out a system of instruction that enriches the environment of disadvantaged children, stimulating verbal intelligence and, later, school achievement. Children at Dr. Deutsch's Institute for Developmental Studies have shown significant improvements in I. Q. test scores, and their achievement in the first grade tends to approximate that of middle-class children. These results agree with findings reported by

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[3]For additional information see: Omar Khayyam Moore, "Technology and Behavior" Luncheon Address, Invitational Conference on Testing Problems, October 31, 1965, Educational Testing Service, Princeton, New Jersey. Maya Pines, "What the Talking Typewriter says" The New York Times Magazine, May 9, 1965.

Masland, Sarason and Gladwin[4] that the least difference in intellectual functioning between social classes is at the youngest age levels, and that intellectual divergence increases sharply with age.

To temper this divergence, the enrichment program at the Institute places emphasis on receptive and expressive language, visual-motor functions, auditory discrimination, conceptual development, and the development of a positive self-image. The Institute uses a great variety of techniques, systematized in presentation and timing by individual and group developmental schedules.

Another contribution to the field of early childhood education is Dr. Maria Montessori. She developed didactic materials to train the senses and to teach concepts of color, form, size and length. We are presently testing some of the more promising didactic materials as well as designing our own devices. In either case, the materials used are self-correcting and self-pacing.

Similarities among these approaches are intriguing. All stress learning by discovery, for which responsive, enriched or structured environments are essential. All emphasize that symbolic and linguistic skills are the foundations for later academic performance. Furthermore, Piaget's extensive findings regarding cognitive development in children[5] also support the rationale reflected in the responsive environment milieu.

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[4]Richard L. Masland, Seymour B. Sarason and Thomas Gladwin, Mental Subnormality. New York: Basic Books, Inc., 1958.

[5]Jean Piaget. The Growth of Logical Thinking in the Child. New York: Basic Books, 1958.

During the first year of the study, we did not attempt to formulate and test specific hypotheses because our experimental group was too small (27), and the techniques we used were still in the developmental stages; but a preliminary analysis of the data is very encouraging. For this analysis, see Appendix A.

PROPOSAL

This proposal can be broken down under the following headings: (1) development of procedures and curriculum; (2) evaluation of the effectiveness of the total program; (3) development of demonstration materials, and; (4) planning for broad implementation. These are interlocking parts of the proposal and cannot be separated easily. For example, one major criteron of success is that any given element of the program can be broadly implemented. Obviously, this will affect our decisions in development and evaluation.

DEVELOPMENT OF PROCEDURES AND CURRICULUM

Determining the Effectiveness of the Present Procedures

Substantiated as it is by the work of Moore and Deutsch, we are confident that our general approach is achieving desirable results, but we are not sure which methods and materials are most productive and which are least productive. In a responsive environment classroom, where a child is allowed to choose what he will do and to engage in an activity as long as he likes, each activity that is available competes against all other activities for his attention. Since the child's time is limited, there is a need to limit the amount of stimuli presented to the child; thus, what to include and what

not to include in the nursery school environment is a critical decision. There is a tendency to put too much equipment in a nursery school and assume that all activities are of equal merit. For example, the assumption implicit in the decision to have a house-keeping corner is that it has a value equal to the reading-listening area or to the manipulative toys. This assumption and others like it need to be tested. It may be that some activities traditionally included in a nursery school should be eliminated and others reduced in importance by limiting the time they are available.

Developing New Curriculum and Procedures

We started the school by including all of the things that looked promising and, as we stated above, each must now be analyzed in terms of its relative efficacy; at the same time, however, it is necessary to develop new procedures suggested by the research of others as well as our own observations. Currently, our work is concentrated upon the improvement of concept formation, problem solving, and the development of a positive self-image. Examples are given in Appendix B.

Systematizing the Promising Procedures

As we develop promising procedures, we describe them, test them and incorporate the proved ones in the teacher's guide.

Our objective is to develop teachers' guides that explain the particular problems environmentally deprived children have; the remedial action that can be taken; and describe specific activities that can be carried out effectively. This comprehensive guide will include the lists of necessary equipment, supplies, books and records and the source of supply for each. In Appendix C, there is a preliminary draft of the guides we are developing for booth assistants and a guide for use by classroom teachers.

Systematizing promising procedures will enable the program to be implemented on a broad scale, because it must be within the ability of an average teacher in an average school district.

The Responsive Environment Booths

A crucial part of our program is the use of the responsive environment booths. We are paralleling Moore's methods[6] with one important exception -- we are not using the Edison Responsive Environment, i.e., a computerized "talking typewriter." Instead, we are using electric typewriters and booth assistants.[7] Our major concern at this point is the problem of broad implementation. Moore's results have been astonishing, and he has received considerable favorable publicity; but the cost of the E.R.E. machine ($35,000) is a major deterrent to the wide-spread adoption of his program.

Our hypothesis is that we can achieve substantially the same results without the computer as Moore and others have achieved with the computer. The reasoning behind this hypothesis is this:

1. Moore was obtaining outstanding results in his responsive environment before the E.R.E. was developed.

2. Even after the development of the computerized talking typewriter, a child at Hamden Hall did not spend more than one-fifth of his time in the responsive environment booths using the E.R.E. -- the remainder of the time was spent using electric typewriters or writing on a chalkboard.

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[6]This parallel is detailed in the booth assistant's guide in Appendix C.

[7]In addition to the electric typewriter, we are adding the Bell and Howell Language-Master as standard equipment in our responsive environment booths. (See Appendix B. for a description of this machine and some of its functions.) This enables us to record words or sentences and play them back. The children can operate this machine with a limited amount of help from an adult.

3. Even with the problems of starting a new school, training teachers and booth assistants, and working out procedures during the first year, we did obtain results comparable to Moore's. Any real comparison at this time is not possible because Moore has not reported his results in a systematic way. However, based on personal conversations with him we have concluded that the gains in our children's I.Q. test scores -- 'though apparently not as great as his -- compare favorably with and substantiate his findings. He reports the greatest gains with children who begin with above average I.Q. scores; of course, our children begin with low I.Q. scores. Furthermore, many of his children have been involved in the responsive environment for two years or longer; our results are based on children with seven month's involvement.

Our proposal is to parallel Moore's work except for the use of the E.R.E. and then to compare results. This certainly will not be a rigorously controlled experiment; but as more data become available from our study and studies using the E.R.E., everyone should be able to make more intelligent judgments about the importance of the E.R.E. machine and when or under what circumstances it becomes essential.

If we can achieve comparable results, the chances of broad implementation are much greater. For a responsive environment using booth assistants and electric typewriters, our cost per child for the school year is less than $93.00.[8] Such costs certainly make the program financially feasible. Furthermore, the use of the booth assistants has the additional advantage of providing a meaningful work-study and teacher training program. By using undergraduate college girls majoring in elementary education as booth assistants and by rotating their duties so that they spend two days in the booths and one day as a teaching assistant, we are training

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[8]The $93.00 includes the operating cost plus a capitol outlay for the construction of two booths and equipping them with an electric typewriter and a Bell and Howell Language Master. The cost per booth is $1,000.

six teachers a year (this can easily be increased to eighteen). There is no reason why this cannot be combined with the Office of Economic Opportunity work-study program. In fact, we have one booth assistant now who is in the work-study program. Although only a beginning freshman in college, she is doing an excellent job as an assistant. Judging from this experience, a capable high school senior could also serve as a teaching and booth assistant.

Evaluating the Effectiveness of the School

Our first major hypothesis is: The children who attend our experimental nursery school will perform significantly better in school than they would have if they had not attended the school. Better performance in school will have a positive effect on their ability and desire to remain in school and to continue their education beyond high school. And remaining in school will reduce the incidence of juvenile delinquency and unemployment. Of course, the nature of this hypothesis dictates a longitudinal study of at least twelve year's duration. Obviously, we cannot wait twelve years to see if a program such as ours will help to break the poverty cycle; consequently, we have developed a number of working hypotheses:

1. For the children attending the New Nursery School (N.N.S.) there will be a significant change in test scores and/or achievement from the pre-test to the post-test on the following measures:

   1.1 Stanford-Binet Test of Intelligence, Form L-M.

   1.2 Peabody Picture Vocabulary Test.

1.3 Tests of concept formation.[9]

1.4 Tests of the development of the senses and perceptions.[9]

1.5 Tests of language skills.[9]

1.6 Vineland Social Maturity Scale.

2. When compared to control group A (middle-class children attending a church nursery school), the N.N.S. children will test significantly lower on all measures on the pre-tests, but these differences will be significantly less at the end of the year.

3. As the children who have attended the New Nursery School enter kindergarten, they will be matched with Spanish-American children who did not attend the school. The hypotheses are:

3.1 The children in the experimental group will perform better on intelligence tests than children in this matched control group (B).

3.2 The N.N.S. children will be judged more successful by their kindergarten teachers and as more likely to succeed in first grade.[10]

3.3 The N.N.S. children will achieve at a higher level in school and score better on achievement tests.

3.4 Fewer N.N.S. children will be required to repeat grades in school.

3.5 Fewer N.N.S. children will drop out of school.

3.6 More N.N.S. children will continue schooling beyond high school.

A second major hypothesis is that the same responsive environment approaches that we are using with deprived children will also improve the achievement of non-deprived children. To test this hypothesis, we opened

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[9]The problem of developing adequate tests is discussed later in this proposal.

[10]A new and promising diagnostic procedure has been developed for this purpose. See John Wilson and Mildred Robeck, Kindergarten Evaluation of Learning Potential, second edition, Santa Barbara, California: Sabox Publishing Company, 1965.

the R. E. N. School (Responsive Environment Nursery School) in October, 1965. The children who attend this non-profit school come from families who can afford to pay tuition. The methods, procedures, and program, including the use of responsive environment booths, parallel those at the New Nursery School.

The working hypotheses are:

1. For the children attending the R. E. N. School, there will be a significant change in test scores and/or achievement from the pre-test to the post-test on the measures mentioned above.

2. When compared to control group A, the R. E. N. children will not test significantly different on pre-tests, but will score significantly higher on post-tests.

3. When compared to the N.N.S. children the R. E. N. children will score higher on all measures at the beginning of the year and the difference will not change significantly during the year.

In addition to testing these general hypotheses, the four groups of children included in the study will enable us to develop and test more specific hypotheses on the nature of the differences between the so-called deprived children and non-deprived children. This in turn will lead to developing new techniques and procedures to aid the deprived children in overcoming their handicap.

Devising Better Methods of Evaluating the Results

To make better evaluations of the effectiveness of our educational program, we will have to develop better testing techniques. These techniques should also be of value in evaluating "Head Start" projects.

At the present time we depend for evaluation upon the Stanford-Binet, the Peabody Picture Vocabulary Test, case studies, and observed changes in behavior. As valid measures of intelligence for this group, the tests are

suspect; but they do predict success in school. Of course, the case studies are valuable and we will continue to use them; however, all of these techniques measure general changes. We need to be able to assess specific changes in behavior on language skills, sensory perception, listening skills, concept formation, problem solving and the development of a positive self-image. Although we have made a start, the techniques need to be refined and standardized. The Categories Test and the Tactual Performance Test described in Appendix D are two examples. We have developed a test for color recognition and are working on tests for specific concepts such as "the same as," "over," "under," and "between."[11] As we develop new procedures, the concomitant development of evaluation procedures will be an integral part of the process.

Demonstration

During the coming year, the major emphasis will be upon the evaluation of existing procedures, developing new ones, systematizing the most promising procedures and developing materials for demonstration purposes. We assume, however, that we cannot postpone incidental, but important demonstration activities similar to those we were involved in last year. Examples of these activities are in Appendix B.

The major effort in 1966, therefore, will be in the development of material for demonstration purposes. We will make three twenty-minute films -

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[11]Parts of the Illinois Test of Psycholinguistic Abilities seem adaptable to this section of the evaluation battery. See S. A. Kirk and J. J. McCarthy, The Illinois Test of Psycholinguistic Abilities -- An Approach to Differential Diagnosis, American J. ment. Defic., 1961, 66, 399-412.

one on concept formation activities, one on the general approach used in the school, and one depicting the responsive environment booth procedures. We will develop several narrated slide presentations to illustrate and describe various aspects of the school, and we are writing a book that describes the school from the theory behind our practices to the details of methods and procedures.

The following year the emphasis will be upon three modes of demonstration. First, we will plan a series of conferences in Greeley using the New Nursery School as a demonstration center. Second, the director, assistant director, and head teacher will be available as speakers for various educational meetings and conferences and as consultants in helping to establish schools that will agree to serve as demonstration centers. An excellent example of how this can work is at Sumter, South Carolina.[12] Finally, the film and slide presentations will be loaned to interested groups, and the book will be available for detailed guidance in operating such a school.

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[12]In February, 1965, the Superintendent of Schools in Sumter contacted the director of the New Nursery School to ask assistance in establishing a pilot program in Sumter. After discussing the question of segregation and coming to the conclusion that the program will foster integration, we agreed to train the teacher for the pilot school. This teacher spent ten weeks working in the New Nursery School and studying related theory. She opened a school in October, 1965 and the director of the New Nursery School visited Sumter at the invitation of the Superintendent and the School Board on October 20th and 21st. At that time the decision was made to plan for 25 units to serve 900 three-, four-, and five-year-old children (250 white and 650 Negro). The first three units will open in September, 1966.

Another carefully selected teacher is currently in Greeley for ten weeks of training. From mid-March through May the two teachers we have trained will train eight more teachers who are currently seniors at Morris College in Sumter. From this group of eight students, one or two will be selected as demonstration teachers for the Sumter project. In cooperation with Morris College and perhaps the University of South Carolina, the staff of the New Nursery School and the demonstration teachers will train other teachers for the twenty-five units. The staff of the New Nursery School will work with Morris College to develop an adequate training program and perhaps the University of South Carolina will allow some of its students to take their practice teaching at the New Nursery School in Greeley.

Another possible demonstration mode would be to combine three ordinary house trailers (10' by 40') into one mobile demonstration unit. This unit would include all the facilities needed for a responsive environment and could bring demonstrations to the teachers rather than bringing teachers to the demonstrations.

Implementation

The ability to implement the program depends upon two factors: (1) The systematization of procedures so that an ordinary teacher can understand what needs to be done and how she can do it; and (2) the financial feasibility of the undertaking.

We have already discussed the plans to systematize procedures. The next step is to establish two centers to field-test our developments. This will be done in cooperation with local school districts or community action projects that are operating nursery schools under the Head Start Program. We will bring the teachers to the New Nursery School for two weeks of intensive training, provide them with all the necessary guides, and have them return to their community and open their schools. They will be expected to feed back information on the problems they encounter, errors and omissions in the guides, and similar information. Our staff will limit its activities to evaluating this feedback. We will not provide additional assistance to these teachers as we want to assess the program under realistic conditions.

The financial feasibility of the program is easily demonstrated. Currently, our operating costs (excluding research) are below $500 per child per year. This includes all costs: salaries, supplies, equipment, rent and maintenance of a building, etc. The long-range impact that such a program

will have on delinquency and unemployment is speculative, but a fairly direct comparison can be made between the cost of nursery school education and special education for mentally-retarded children. To educate a mentally-handicapped child in Colorado in 1963-64 cost $925.73 compared to an average cost per child of $416.17. A child usually is assigned to an M.-H. classroom during his third year in school and remains there at least six to eight years. The additional cost to the State for this special education is from $3,000 to $4,000 per child. During our first year we had five children whose I.Q. test scores changed from a classification of mentally-handicapped to a classification of normal. By enabling these children to succeed in regular classrooms we will save the State from $15,000 to $20,000 -- enough to operate our nursery school for thirty children for one year. Furthermore, if Martin Deutsch is right in stating that there is a regression in I.Q. scores for these children after they enter the first grade unless remedial action has been taken prior to that time, at least two more of our children probably would have regressed to the classification of mentally-handicapped. And this measure of dollar-value is negative. It fails to consider the increased contribution we expect our students to make not only in dollar-value but also in human values.

Time Line

February 1, 1966 - A twenty-minute narrated slide presentation will be available either on loan or sale (at cost) to interested individuals in colleges or community Head Start projects. We currently have two requests from Utah State University and the Ogden (Utah) Public Schools for such a slide program.

April 1, 1966 - A twenty-minute film on the responsive environment booths will be available for loan to interested groups.

June 1, 1966 - As a guideline for Head Start programs, a loose-leaf book giving the tentative theory and detailed procedures used at the New Nursery School will be available.

The second twenty-minute film on activities for concept formation and problem solving will be completed.

August 1, 1966 - The third twenty-minute film, one covering the general classroom procedures, will be available.

September 1, 1966 - Preliminary evaluation procedures to test specific accomplishments of children in Head Start programs will be available.

December 1, 1966 - Report on the effectiveness of the first two years of the operation of the New Nursery School. The report will include:

1. First grade achievement to date of the first fifteen children who attended the New Nursery School. Their achievement will be compared to that of two control groups.

2. The judgment of the kindergarten teachers regarding the probable success of the fifteen additional N.N.S. children who will be in kindergarten that year.

3. Results of pre-and post-test data as well as case studies on the forty-five children who will have completed at least one year at the New Nursery School.

4. Comparisons with local control groups and, if data is available, with similar children who were trained with an E.R.E. machine.

APPENDIX A

A PRELIMINARY ANALYSIS OF THE DATA FROM THE FIRST YEAR AT THE NEW NURSERY SCHOOL

APPENDIX A

A PRELIMINARY ANALYSIS OF THE DATA FROM THE FIRST YEAR AT THE NEW NURSERY SCHOOL

At the outset of the program, we tested the experimental group and a control group of middle-class children of the same age attending a church-sponsored nursery school in Greeley (control group A). The Stanford-Binet Test of Intelligence (Form L-M) and the Peabody Picture Vocabulary Test were administered to every child capable of responding meaningfully at that time. (It was not possible to establish a base on the Binet for several of the disadvantaged children.)

At the end of that school year (May, 1965) we retested both groups on the Peabody Picture Vocabulary Test and are currently retesting on the Stanford-Binet Test. The retesting on the Stanford-Binet will not be completed until January, 1966, because we wanted a lapse of one year between tests; thus, we are presently unable to report on the final results using this test. On the Peabody Picture Vocabulary Test (P.P.V.T.) the following results were obtained:[1]

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[1] We are anxious to compare and further explore the results of the P.P.V.T. with the S-B in terms of findings reported by Fowler (1957), Higgins and Silver (1958), Kendler and Kendler (1961), and Jensen (1965) wherein it is indicated that lower-class background children perform more poorly on non-verbal tests of intelligence than on highly verbal tests. We have other totally non-verbal tests, such as the Raven Colored Progressive Matrices and The Children's Categories Test, which we intend to employ, elaborate, and refine. See Arthur R. Jensen, "Verbal Mediation and Educational Potential," memo report, University of California, Berkeley, 1965.

Twenty-seven of the thirty children who started the nursery school in September, 1964, remained the entire year. Of these twenty-seven children, complete pre-and post-test data was obtained for twenty-five.

As Table I shows, the mean Peabody I.Q. for the twenty-five children for whom complete data was obtained was 82.92 at the beginning of the year; this represented an I.Q. range of 55 to 109 (SD=16.27). For twenty-two children in the control group, the pre-test mean was 110.68 and I.Q. scores ranged from 85 to 125 (SD=9.99).

TABLE I

Peabody Means and Standard Deviations Calculated for Experimental and Control Groups at the Beginning and End of Nursery School Experience

Group	(N)	Pre-Test		Post-Test		Mean Change
		Mean	SD	Mean	SD	
Control	(23)	110.68	9.99	107.86	11.22	- 2.82
Experimental	(25)	82.92	16.27	90.56	15.19	+ 7.64*
Mean difference		27.76		17.30		

*Significant .01 level of confidence.[2]

At the end of the year, the post-test mean for the experimental group was 90.56 with a range of 61 to 114 (SD=15.19). For the experimental group, the change in the mean scores from the pre-test to the post-test was +7.64. When a test for paired observations[2] was conducted on this mean difference, the obtained t value (3.02 with 24 degrees of freedom) was significant at the .01 level of confidence.

[2]Edwards, A. L., Statistical Methods for the Behavioral Sciences, Holt, Rinehart and Winston, N.Y., pp.278-281.

At the end of the year the post-test mean for the control group was 107.86, with a range of 87 to 131 (SD=11.22). The change in the mean scores from the pre-test to the post-test for this group was -2.82. This negative mean change between the pre-and post-test scores of the control group was not significant at the .05 level of confidence.

When the experimental and control group means were compared at the beginning and end of nursery school experience, the mean I.Q. score for the control group on the pre-test was 27.76 points higher than the mean for the experimental group. The post-test mean for the control group was only 17.30 I.Q. points higher than that of the experimental group. By inspection of Table I it becomes apparent that the magnitude of the mean difference between the two groups has changed substantially. This reduction in mean difference, plus the significant mean change found in the experimental group data are meaningful indicators of the success of the experimental nursery program for the first year.

Related case study information gathered throughout the first year further establishes the general success of the program. For example, one child at the New Nursery School had an increase of 29 on his Peabody I.Q. score. Others had increases of 27, 26, 23, and 21. Ten children's scores increased by more than ten points, twelve increased more than five points, eleven remained about the same (varied plus or minus five points), and two decreased more than ten points. In addition, the seven children who spent the most time in the typing booths showed an average increase in I.Q. points of 15.43, compared to a mean gain of 7.64 for the group as a whole; however, some children who spent less time in the typing booths also showed a substantial gain in I.Q. test scores.

At this time all we can say is that the data are encouraging. We seem to be achieving substantial upward changes in some of the children's I.Q. test scores on the P.P.V.T. Since these test scores do correlate highly and positively with success in school, we can hypothesize that the children will do better in school. Early results also indicate that the gap between deprived children's measured scholastic ability and the measured ability of nondeprived children can be narrowed.

Observations substantiate the test results on the Peabody. One child who started with an I.Q. score of 87 can read and type over twenty words and can use the words to dictate stories to the teacher. Two children can read and type some words. Most of the other children have no difficulty in locating all the letters on the typewriter, and most of the children can name the eight basic colors.

This fall, sixteen of our children entered kindergarten. In the judgment of their teachers, these children are doing considerably better in school than the teachers would normally expect of children with their background.

To gather more evidence, we also have identified a group of similar Spanish-American children who are attending the same public schools, but did not attend the New Nursery School. These children will serve as Control Group B. As these children and those from the New Nursery School progress in school, more reliable and meaningful statements about comparative performance will be possible.

APPENDIX B

EXAMPLES OF DEVELOPING NEW CURRICULUM AND PROCEDURES

APPENDIX B

EXAMPLES OF DEVELOPING NEW CURRICULUM AND PROCEDURES

Concept Formation

In this lesson, the teacher uses a sugar beet, granulated sugar, powdered sugar, and brown sugar. She cuts the sugar beet and gives each child a taste, telling him that sugar is made from this beet. She then gives each one a taste of granulated sugar, of powdered sugar, and of brown sugar. Each child will ask for more sugar and, as he does, the teacher asks, "Which kind?"

The child says, "That one."

The teacher answers, "This is brown (or granulated sugar or powdered sugar). You say, 'Brown sugar,'" The child tries to say it as he receives another pinch of sugar.

This lesson has the advantage of using a number of senses to teach a concept--seeing, hearing, feeling and tasting. Many other lessons like it need to be developed. Also, to help the children form concepts or categories, we have created a concept formation area. One week there will be a display of vegetables--a tomato, a can of tomatoes, a can of tomato juice; peas, peas in a pod, a can of peas; beans, beans in a pod, a can of beans, etc. On the bulletin board above this display are pictures of the vegetables. These are all vegetables, and the beans in a pod and the can of beans are different forms of the same vegetable. Another week, fruits will be displayed in a similar way. To test concept formation, we are currently experimenting with the Categories Test (see Appendix D). This test mechanically

controls the presentation of items to be matched or eliminated according to such categories as size, color, brightness, shape, etc. Since the machine also provides immediate feedback, it can be used as a learning device as well as for testing. The immediate feedback of knowledge of results is compatible with the notion of a responsive environment.

Problem Solving

While giving the Peabody Picture Vocabulary Test, it became obvious that many of the deprived children could not arrive at the right answer by the elimination of wrong answers (they are asked to point to which of four pictures is correct). On the other hand, most of the nondeprived children are able to eliminate wrong answers in arriving at the correct one.

We are working out methods that will help children learn to solve this kind of problem. One approach is the use of Bell and Howell's Language-Master, a machine that records on two channels (instructor-student) on a magnetic tape located across the bottom of a card somewhat larger than an I.B.M. card. The child can operate the machine without assistance, and he is free to play with it. On a card we paint red, write the word "red," and record "This color is red." When a child knows the names of at least three colors, an assistant displays the cards with these three colors plus one the child cannot identify and asks him to pick the unknown color. Thus, the child can be right by eliminating the wrong responses. He will find this out for himself by running the selected card through the Language-Master.

Self-Image

We have tried to structure the entire environment of the school to help children develop a realistic, positive self-image. For example, we

discourage adult-initiated conversations. Unless the adult knows a child well enough to anticipate the child's response, the adult's questions are often threatening. However, the adults are instructed always to respond to a child-initiated conversation.

Some special procedures have also been used to develop a positive self-image. We use telephones as an aid to develop the child's use of descriptive language. A wide selection of costumes are available so the child can dress up as a policeman or fireman or cowboy, look in a full-length mirror, and describe what he sees to the teacher on the telephone.[1] In addition to the development of a self-image, the combination of dressing up and describing himself should also contribute to language development. To further the development of a positive self-image, each child has a carrel with his picture in it for his coat and his boots. We have also printed the child's name on a Language Master card so the child may record his name on the card. He may re-record his name as many times as he wishes. Many children have said, "That's my name and me saying it," or "That's you saying my name." Still, additional procedures are needed. David McClelland's research on achievement motivation[2], Robert Sears' on early childhood identification[3],

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[1]Lassar G. Gotkin, (et al) Standard Telephone Interview memo report, Institute for Developmental Studies, Department of Psychiatry, New York Medical College, 1964.

[2]David McClelland, The Achieving Society, New York, D. Van Nostrand, Inc., 1961.

[3]Robert Sears, "The 1958 Summer Research Project on Identification," Journal of Nursery Education, 1960-61, 16:2.

and Mary Ellen Goodman's[4] on race awareness in young children will aid the development of additional procedures. This research will also serve as a guide to the study of the origin of the need to achieve and its relationship to parental attitudes, social class and membership in minority ethnic groups.

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[4] Mary Ellen Goodman, Race Awareness in Young Children. New York, Collier Books, 1964.

APPENDIX C

TWO EXAMPLES OF DEVELOPING DETAILED

GUIDES FOR TEACHERS

October 29, 1965

New Nursery School

Nimnicht and Anderson

The tutoring booths are a responsive environment, that is:

(1) They permit the learner to explore freely;

(2) They inform the learner immediately about the consequences of his actions;

(3) They are self-pacing, i.e., events happen within the environment at a rate determined by the learner;

(4) They permit the learner to make full use of his capacity for discovering relations of various kinds, and;

(5) The structure is such that the learner is likely to make a series of inter-connected discoveries about the physical, cultural or social world.

The tutoring booths are also designed for autotelic activities; that is, activities that are done for their own sake rather than for obtaining rewards or avoiding punishments that have no inherent connection with the activity itself.

Rules for the child in coming to the reading booth are:

(1) Say to the child, "Now its <u>your</u> turn to play with the typewriter."

(2) He need not come to the booth if he refuses.

(3) He can leave when ever he wishes;

(4) He must leave when his time is up (20 minutes maximum stay);

(5) He need not explain his coming or going;

(6) He goes to the booth to which he is assigned for the day;

(7) If he says he wants to leave, or starts to leave, he can come back again the next day but not the same day.

Rules for the booth assistants are:

(1) You ask a child only once a day to come to the booth; if the child later asks to come, he is allowed to do so;

(2) You never ask a child to come to the booth if the child is obviously involved in another activity.

(3) You are a part of the responsive environment and only respond to the child, that is, answer questions, announce letters as the child strikes them, etc. You should be friendly and responsive, but do not direct or teach the child; let him discover and learn for himself.

(4) The <u>only</u> punishment you may use in the booth is to say, "I'm sorry, your time is up," and take the child back to the main room.

The activities in the booth move through four phases.

Phase I: Free Exploration (the same for both groups)

The first time you take a beginning child into the booth, select a child who has already been in the booth and ask that child to show the beginner the booth and the game. Let them explore freely then return to the room. On the day following this first experience the booth assistant invites, ("It's your turn to play with the typewriter now,") the child to come into the booth. Avoid asking the child when he is obviously involved in some other interesting activity.

Prior to entering the booth, paint the child's fingernails with water colors. There is a match between the nail colors and the colored typewriter keys so that striking the keys with matching fingers constitutes correct fingering. If the child asks why you are painting his fingernails, say, "It's part of the game." The match between nail colors and key colors is not pointed out to the child. Most of the children will want to leave the paint on their fingers after they have typed. Let them.

Upon entering the booth seat the child on the stool in front of the typewriter; take your seat; turn on the typewriter and say, "Do you want to play with the typewriter?" Attempt to be as unobtrusive with the typewriter switch as possible. As the child strikes the letters and symbols, you name them. If the child hits more than one key at a time, turn off the typewriter, free the jammed keys, and turn the typewriter on. If the child again hits several keys at once, follow the same procedure but turn off the typewriter as soon as the child starts to strike more than one key at a time and leave it off until the child starts to punch one key at a time. Repeat this process until the child discovers for himself why the typewriter doesn't work. If key jamming becomes a persistent and dangerous (to the typewriter) behavior, say "Just one finger" immediately after freeing the jammed keys. Speak the words in a completely friendly and nonpunitive tone of voice and repeat the statement no more than twice in a single day.

The first time the carriage reaches the right hand margin, the child will not know how to return the carriage, after allowing some time for

the child to explore, press the return and say, "See what happens when I press this?" After this first demonstration, you simply turn the typewriter off when the carriage reaches the end until the child presses the return key.

As far as the child is concerned, he is not learning the names of the letters, numbers, and punctuation marks. He is learning to associate abstract symbols and sounds. He will probably react to "A", "X", "5", and "asterisk" in the same way and learn the name "asterisk" as easily as "A" or "B". If a child demonstrates some knowledge of letters or numbers, this is noteworthy and should be included in your report. If the child locks the shift key in upper case, speak the names of any keys touched just as if they had been lower case.

The child will indicate in one way or another that it is time to move to the next phase. Some children will name the letter or number before the booth assistant does. Others will start to lose interest and the time they spend in the booth will decrease. Whenever you think a child is ready to start Phase II, ask a senior staff member about making the change.

Phase II: Search and Match - Group A

The learner should not be told that he is beginning a new phase - let him discover this for himself. At the beginning of Phase Two the upper case letters are presented one at a time on a white 8" by 10" card with a red arrow pointing to the letter. (The red arrow becomes important in a later step of this phase and will be explained at that time). The cards are on a stand so that they can be displayed one at a time.

When a child comes into the booth, the stand should be on the table next to the typewriter. If the child points to the stand and asks what it is, you say "That's part of the new game." If the child points to the letter, name the letter; and if the child points to the arrow, tell him its a red arrow. The typewriter should be locked in upper case. The object of the game is for the learner to find the key that has the same letter as the one he sees on the card. The typewriter should be turned off until the child starts to strike the right letter. Be patient. At this point your inclination will probably be to help the child solve this problem, but don't! The children will try many things to make the typewriter work but sooner or later most of them will discover the rules to the new game without your help and you will both probably feel elated.

Some children will occasionally want to "play the other game." Allow a child to go back to Phase I whenever he asks to. Set the rack with the card on the floor by the table to indicate that the rules of the game have changed and go back to Phase I, but each day start with Phase II.

At the beginning of Phase II, the keyboard is covered with an aluminum shield which has openings cut out only for two keys -- "s" and "o". This simplifies the problem and makes it easier for the child to succeed.

Step 1. The letters on the cards at first consist of only "S" and "O" arranged in random order. The keyboard is turned off until the child attempts the correct key in order to prevent an error. In this way the child is able to make only "correct responses" and should develop quickly a feeling of mastery or control over the environment. This feeling is essential to the development of a self concept characterized by competence, the ability to do well, and self worth. Permit the child to type until he or she has completed ten correct trials or letter matches in succession.

Step 2. At this point the shield over the keyboard should be changed to the one with four openings. The child is now required to search for the correct key from among a total of four. Children should quickly learn to make many correct responses and should find great satisfaction in their "success."

After twenty successive correct responses with the 4-letter problem, cover the keys with the shield that exposes ten keys.

Step 3. This step is different from the previous one only in that the letters to be typed must be chosen from among ten alternatives. Turn the typewriter on as the child approaches the correct key. Speak the letter immediately following the correct response.

Step 4. There are no shields for this step which involves the whole keyboard. All of the cards have printed on them upper case letters. The procedure for this phase is the same as for the previous steps in this phase. Turn the typewriter on as the child approaches the correct key and speak the letter following a correct response or match.

Step 5. The next problem is to help the child discover the relationship between upper case and lower case letters. First take the cards for the keys that have two symbols visible on the keys such as "?/" or ":;". On the first card the red arrow will point to the "?" (upper case) so the child will not have any difficulty making the typewriter work. On the second card, the arrow will point to the "/" (lower case). The child will probably return to the same key, but it will not work because he has not shifted to lower-case. Again, be patient and let the child search for the right answer. Turning the typewriter on as the child is close to the shift will help him find the answer. After the child has mastered the shift and is going from one symbol to another on the same key without difficulty, start with the cards which have the upper-case and lower-case letters on them. Arrange the cards so that the arrow points to the upper-case letter first.

During step 5, the child should spend about one day out of five playing games at the chalkboard. The first game is based upon the Alphabet card. The booth assistant should write the letters on the chalkboard as they appear on the cards with four upper case letters spaced across the top of the board and the same letter in lower case along the bottom of the board, but in a different order. On the first set of fourteen cards three of the four letters have similar shapes for the upper and lower case forms, but the forms of the fourth letter are not similar in upper and lower case. The child can easily make the connection between "R", and "r", by eliminating the wrong answers. This has three important consequences: The child is learning the different

forms of the same letter, he is allowed to discover them for himself, but is aided in making the right choice, and he is learning to arrive at the right answers by eliminating the wrong answers.

After you have written the letters on the board, give the child the chalk and ask him to draw a line from upper case "C" to "c"; (if necessary illustrate what you want him to do) from upper case "V" to "v"; from upper case "W" to "w"; and from upper case "R" to "r". After the first one or two times, the child will know the rules of the game and you should not talk him through the next group of letters.

Observe carefully the sequence the child follows in drawing his lines. Does he link the letters that are similar in upper case and lower case before he links the one with dissimilar forms? What combination of letters causes difficulty? If at first, the child does not make the connection between the letters on the board and the letters on the typewriter, watch carefully for some indication that he has made this connection. Using the first set of cards, you will not know when the child can recognize the upper and lower cases of the same letter, because he can arrive at the correct answer by eliminating the wrong ones. Go through all the cards in set one once or twice and then switch to the cards in set two. These seven cards have two letters with similar upper and lower case forms and two letters with dissimilar upper and lower case forms. Care has been taken, however, that the forms of the letters are not similar to each other; there are no combinations of "d's" and "b's", or "p's" and "q's", for example. If the child has difficulty, go back to the first set.

After the child can make the correct associations on the second set of cards, use the third set of cards which has three letters to test the child's ability to associate upper and lower case letters.

Phase III: Learning Words

During Phase III, there are two major activities - learning words and writing on the chalkboard.

The learner is asked "Would you like to type a word?" The probable response is yes (so far no one has said "no"). If a child does say no, return to Phase II but ask again the next day. If the child says yes, ask, "What word do you want to type?" Print the word on a Language-Master card and then record the word on the card. Be certain that you make the letters the same way they appear on the typewriter. The child will notice a difference if there is one. If the word is a proper noun, the first letter should be upper case. After you have written the word allow the child to type it. Expect some mistakes such as spacing between letters or no space after the word. You should continue to turn the typewriter off if a child starts to make a mistake. For example, forgetting to shift from upper case to lower case or forgetting to space between words. Spell the word as the child types it and say "space" after the last letter. Continue to allow the child to select new words, write them on the card and allow him to type them. Before leaving the booth, write the child's name on a card, place it on top of the cards with his words and tell him, "These are your words and we will keep them for you."

Remember these words are the child's. Allow him to type any word he chooses regardless of how difficult it may seem to you. If the child cannot think of a word he would like to type, encourage him to talk to you about anything of interest to him; after some conversation, return to the original question. You may suggest words but they should come from his conversation. Each child will choose different words that are strong, meaningful words for him. If the words are important to the child, he will remember them and can tell you what they say the next day. In some instances a child will not think of words he wants to type or he will become bored after typing two or three words. In both cases the child may name anything that comes to his mind. For instance, one child started with "Volks," "Rambler," "Dr. Nimnicht," then looking around chose "door" and "window." The next day he remembered the first three, but had forgotten door and window. In such a circumstance say, "Those are not good words for you," and throw these cards away unless the child asks to keep them.

Each day when the child comes into the booth allow him to type his "old" words and add one or two new ones. If he does not want to type all of the words he has previously learned, go through the cards and have him identify the words or let him run them through the Language-Master.

One day out of five should be spent at the chalkboard showing the child how to print some of the words he has learned.

Phase IV: Writing a Story

Phase IV should begin when the child starts to lose interest in typing new words or when he has a list of fifteen or twenty words. At that point ask the child if he would like to tell a story using his words. The story

may only be one or two sentences but if it is a story to the child, it's a story. As the child tells you the story, write it down and then type it for the child. Be sure to make a carbon copy for the file - the child gets a copy of his story. In some instances a child might ask to type his own story - fine! Help him by dictating the story as he types it, spelling the words that he does not know. In the event the child does not ask to type his own story, after the child has told you two or three stories that you have typed ask him if he would like to type his own story and follow the procedure mentioned above.

Phase V: Reading and Writing

After a child has a list of fifteen or twenty words he recognizes and has written a few stories he is ready to read. Ask him to choose a book that he likes and bring it to the booth with him. Print the first sentence of the book on a card but only expose one line at a time and have the child type it. Read each word as it is typed and each sentence after it is complete. After the first session type the cards out in advance. The child's paper should be saved from day to day so he can see the whole story. After finishing the book help the child read the book and then his typed copy.

From this point on the child may choose his own activity in the responsive environment booth. He may type his own words, write and transcribe a story, write on the chalkboard, read a story or read and type a story.

Rough Draft
November 5, 1965
Oralie McAfee

LANGUAGE GUIDES FOR TEACHERS OF YOUNG CHILDREN

The teacher of young children must be aware of the importance of his use of language. The teacher must be a model of correct speech. He must know how to give directions that can and will be followed. He must know how to ask questions that will elicit appropriate responses. He must know how to give explanations at the child's level of understanding without presenting false concepts. He must be precise in his thinking and in his speech so that he does not, in the process of teaching, teach the wrong things. In addition, the teacher must be sensitive enough to know when to talk, and when not to talk.

Listed below are some suggestions that will be helpful in working with young children.

1. Avoid all mannerisms in speech. Say, "You can paint when she is through," instead of "You can paint when she is through, OK?" or "You can paint when she is through, all right?"

2. Avoid patronization of the child. Say, "Max, take the clay out of your mouth," or "Keep the clay on the table," instead of "We don't put clay in our mouths, do we?"

   Teachers should refer to themselves as "I" during normal conversation, not as "Mrs. Jones." Use other techniques to learn each other's names, not one that distorts the normal use of personal pronouns.

3. Use complete sentences. If a child asks, "What's that?" say, "That is a giraffe," instead of "A giraffe." Whenever possible include the category in the sentence, such as "That <u>animal</u> is a giraffe," or "That <u>color</u> is yellow." The teacher must give the child enough information to keep him from becoming confused. Children who do not have the color names and the concept of color will be confused if the teacher talks about "yellow" and "blue" instead of "yellow paint" and "blue crayons". Children who do not have the vocabulary and the concept of texture will be confused by such statements as "This is rough; this is smooth." Say, "This sandpaper is rough; this board is smooth." Help the child by naming the substance as well as describing its properties. (For further examples see the sections on perceptions and an enriching free play).

4. Whenever it is natural, use nouns instead of pronouns. Say, "Roll the ball to me," instead of "Roll it to me." Say, "Find the square which matches this yellow square," instead of, "Find the one which matches this one."

   Conscious use of nouns by the teachers will help increase the child's vocabulary, and also make it easier for him to follow the direction she is giving.

5. Be accurate in referring to size, weight, height, and other dimensions of objects. Teachers can work toward a refinement of the child's observation and expression. Certain toys in the room have parts that go from smallest to largest. Others are longer, longest, shorter, shortest, or taller, tallest, shorter, shortest. (For elaboration see the sections of science and on manipulative toys). The refinement of a young child's absolutes of "big" and "little" (or sometimes "mamma" or "baby") to more accurate observations is a long process, but it can begin early.

6. Look for opportunities to give simple directions. Following directions not only exercises the child's receptive language abilities, it is a tremendous boost to his self-concept. Of course, the activity must be worthwhile, such as "Clarence, go tell Mary it's time for milk," or "Please go to the other table and bring a chair for John."

7. State suggestions and directions in a positive rather than a negative form. Tell children what to do, instead of what not to do. Say, "Walk where the sidewalk is dry," instead of "Don't get wet." Say, "Stay on the floor," instead of "Don't climb on the shelves."*

8. Give the child a choice only when you intend to leave the situation up to him. Say, "It is time to go inside now," instead of "Don't you think it is time to go in now?" or "Would you like to go inside now?" If you give the child a choice, be prepared to accept "no" for an answer.*

9. Use words and a tone of voice which will help the child feel confident and secure. If possible, move near the child you are speaking to, call him by name, and use a quiet, firm manner. Speak clearly, simply, and to the point. Don't talk too much.*

10. Avoid vague generalities that the child may not be able to apply to his situation. Examples of these are, "Watch out!", "Be careful!" and "Look out!" It is better to tell the child specifically what to do, such as "Hold on with both hands," or "Run around the sand box instead of through it."

11. Avoid motivating a child by making comparisons between him and another child. Do not encourage competition or extrinsic motivation of any kind.*

12. Listen attentively to the children; let them know you understand them and are interested. Mistakes in grammar, pronunciation, or sentence structure should be corrected by the use of a "reflection" or "echo" technique. For example, if the child says, "Us got one dem our house," the teacher can reflect, "Yes, you have a stove at your house." "Her done it" can be reflected as "Yes, Greg, she did it."

    Sometimes this type of interchange takes place. "I seen a squirrel on the way to school." "You saw a squirrel on the way to school?"

    "Yes,. I saw a squirrel and he went right up a tree."

    The child thus hears the sentence correctly, but at the same time his sense of adequacy is maintained and he is encouraged to continue.

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*Katharine H. Read, The Nursery School, (W. B. Saunders Company, Philadelphia, 1960), p. 71-78.

APPENDIX D

SOME EXPERIMENTAL EVALUATIVE PROCEDURES:

A TV TEST OF CONCEPT FORMATION AND PROBLEM SOLVING ABILITIES

A TIMED TACTUAL PERFORMANCE TEST

and

AN AUDITORY DISCRIMINATION TEST

Culture-fair testing is an increasingly pressing challenge to psychometrists as evidence accumulates to indict the currently popular measures of potential on the grounds that they are biased in favor of one or another cultural groups. It does not seem to be satisfactory to simply make the tests non-verbal in order to overcome the criticism that semantics seriously contaminate communication for disadvantaged persons. A recent representative but by no means exhaustive review of literature dealing with the Psychoeducational Appraisal of Disadvantaged Children[1] concludes with the following recommendations:

> . . . . . tests and trained observation should take on new meaning and different diagnostic significance. In addition to appraising learning difficulty, measurement and observation should lead to remedial and compensatory techniques which can be incorporated readily into the curriculum and translated easily into work in the classroom. Psychoeducational appraisal of the disadvantaged pupil confronts us anew with the need to develop assessment procedures that both clarify the mechanisms by which learning occurs and guide the teaching-learning process (pp. 409-410).

We agree with the suggestions included in the above quotation and are quick to add that we are presently empirically validating several promising experimental evaluative procedures. One significant variation on the theme is that we have an on-going program wherein the performance of environmentally deprived children can be readily observed sampled and recorded. This allows us to develop our appraisal techniques and/or instruments as integral parts of the curriculum and as realistically grounded approaches. As a matter of fact, the content of the tests is either identical with or similar enough to the actual curricular content that the tests are also quite usable as teaching aids and are in this sense interchangeable as tests and/or lessons.

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[1] Joan M. Karp and Irving Sigel, Review of Educational Research, XXXV, No. 5, December, 1965, pp. 401-412.

With this somewhat pragmatic rationale, we have sought to both identify parts (sub-tests) of existing standardized tests or batteries and also develop our own peculiar methods of assessment. The following three tests are briefly presented as examples of the numerous testing developments in accordance with which we are now collecting data.

I. A TV TEST OF CONCEPT FORMATION AND PROBLEM SOLVING POTENTIAL

General Instructions for the Administration of the TV Test[2]

Our usual administration of the TV Test aims at the general purpose of determining the child's ability in abstraction or concept formation and problem solving. To achieve this purpose, it is necessary that the examiner elicit the best performance of which the child is capable. We insist that each child observe each item carefully before making a response. Usually the test is reacted to with interest and the child obviously makes an effort to answer correctly. An occasional child will answer apparently at random, and in such instances the examiner must attempt to get him to make a serious effort (or, if this is not possible, to declare the test invalid). Since the purpose is to measure ability in concept formation rather than the child's own motivation for doing well, a variety of techniques may be used as necessary. Some children need to be told repeatedly to observe the items carefully (in some instances they must be asked to describe the figures before being permitted to answer), or to state the reason for selecting a particular response. If a child says only that he was "just guessing", the subject must be encouraged not to "just guess" but to try to figure out the principle.

[2]This is an adaptation of the Category Test which was developed by Halstead to test for biological intelligence or brain damage. It has been refined and elaborated by Ralph Reiton at the University of Indiana Medical School, Department of Neuropsychology, Indianapolis, Indiana; these instructions are a slight modification of those for children (aged 5 through 8 years) which were written by Reiton and his colleagues.

As a general rule, any part of the instructions may be repeated when the examiner believes that it is necessary. Our purpose is to give the child a perfectly clear understanding of the problem he is facing and the rules involved in its solution. The principles themselves are never given to a child, but with children who are extremely impaired in their ability to form concepts, it may become necessary to urge them to study the picture carefully, to ask for their descriptions of the stimulus material (followed by questions directed to the child such as, "Does that give you any idea of what might be the right answer?), to urge him to try to notice and remember how the pictures change (since this often provides clues to the underlying principle), and to try to think of the reason when he gets a correct answer. Children rarely ask the examiner to state the principle, but it is possible that in conversation such as that described above, an unwary examiner may give unwarranted reinforcement to certain of the child's hypotheses. The examiner should always remember that his questions and advice should be consistent with the aims of the formal instructions rather than to provide in any way information relevant to the solution of the problems presented by the test. The only information of this kind comes from the bell or buzzer immediately following each response.

Most children are able to take the TV Test with little more additional information or direction than is provided in the formal instructions. Seriously cognitively debilitated children may find the test rather trying and frustrating. The examiner should make every effort to encourage the child to continue working at the task, although any direct comment or response related to the underlying principle should never be made. If a child shows no sign of making progress on any one of subtests 3 through 6 in the first

20 items and <u>also</u> gives evidence of considerable frustration with the task, it is better to discontinue the test at this point and pro-rate the error scores than to run the risk of not being able to complete other tests.

Some additional points should be mentioned briefly:

1. Although speed is not a factor and children should not be hurried, neither should they be permitted to sit and daydream or to take an unduly long time to respond. Some children would impair the continuity of the test if not encouraged to make reasonably prompt decisions and thus impair their prospect of making better scores.

2. The examiner should always be alert to the slide on the screen, not only to keep in touch with the subject's performance, but also since occasionally a slide somehow gets out of order and a quick change of the "answer" switch is necessary.

3. The testing room should be somewhat darkened, yet light enough for the examiner to record errors.

4. The subject should sit directly in front of the screen. The colors are particularly difficult to see from an angle.

5. Slides may jam when the edges are bent or frayed. Also, slides seem to jam more readily when the slide-changing switch is moved through the center position too quickly.

6. If the projector bulb does not light, it may be burned out or possibly the fuse, located at the back of the box next to the projector, may be blown.

7. When the test is completed, turn the projector light off but let the cooling fan run for a few minutes.

8. Moving parts of the projector should be oiled occasionally. Be careful to avoid getting oil on the lenses.

<u>Instructions for the Operation of the TV Test Projection Apparatus and Control Mechanism</u>

Before administering the test, be sure that all plugs are connected, including those which plug into the back of the TV projection box. If one or more of these is not connected, the key board will not light nor will the projector operate.

On the side of the LaBelle Automatic Slide Projector there is a lever which is used for manually advancing slides. Depress this lever twice to insure that all slides from a previous testing have dropped from the slide projector into the receiving magazine. (This should be done after each testing in order to avoid disarrangement of slides). Two magazines are used. Feed the slides into the top of the projector, making sure that the magazine fits securely. The slide projector will not advance slides if the magazine is loose or incorrectly secured. Securely place the second magazine into the opening under the lens. Depress the manual advancing lever twice in order to get the first slide into viewing position. The machine is now ready for the test.

Carousel slide projectors which have a capacity of at least 80 slides will substitute for the slide projector provided they fit the TV projection box.

The control panel consists of a clip for the testing form and two switch levers located on the right side of the control panel. The upper lever, #1, controls the manual advancement of slides and will pivot to three positions - upper, central, and lower. The lower lever, #2, with five available lever positions controls the "bell" and the "buzzer", indicating correct or incorrect responses. You will notice that the pattern for the lever positions resembles a cross, $\begin{smallmatrix} & 1 & \\ 4 & A & 2 \\ & 3 & \end{smallmatrix}$. These positions correspond with the keyboard in front of the TV projection box and with the scoring form. You will notice in subtest 1, the correct answer for the first slide is 1. Therefore, the examiner would place the lever in the "1" position. The

bell indicating a correct answer will sound only if the subject pulls the red-lighted key; a buzzer will sound for any other response. The next answer is 3 on the scoring form; the lever should be set in the "3" position. If the subject pulls the yellow-lighted key he will now hear a bell for this response.

When lever #1 is placed in the upper position, the examiner may advance the slides using only lever #2. When lever #2 is moved from one position to another, (passing through the "A" position) the slides will change automatically. If the #1 lever is placed in a central or neutral position, the #2 lever will not advance the slides. This permits the examiner to first set the correct number position with lever #2, and then advance the slide by putting the #1 lever into the lower position.

When lever #2 is incorrectly set or if the wrong slide appears on the screen, the examiner should reset answer before the subject selects a key. This is done by setting lever #1 in the central position (which releases the automatic switch in lever #2) and then set lever #2 into the correct answer position. When #2 lever is set into correct position, lever #1 can be returned to the upper position. Now lever #2 will again change the slides automatically.

Slides may be changed manually by pulling #1 lever into the lower position. Since the lower position will advance only one slide at a time, the lever returns to central position when released. To advance another slide just pull lever into lower position again.

The slides are arranged in order according to the score sheet. The examiner should carefully follow the score sheet in setting lever #2 for the

next correct response. A check (✓) in the right side of a column indicates a correct response and an (X) in the extreme left indicates an error. A star (*) may be placed on the score sheet next to an item where any special help is given.

The score on the test is the total number of errors on all seven tests. At the bottom of the test sheet, write in a description of any unusual behavior observed, or help that is given if this is more than usual, or any other comments which will be of assistance in clarifying the test performance.

Directions for Administration of the TV Test

ON THIS TV SCREEN YOU WILL SEE PICTURES OF DIFFERENT FIGURES AND DESIGNS. EACH PICTURE WILL MAKE YOU THINK OF A COLOR, EITHER RED, BLUE, YELLOW, OR GREEN. ON THIS KEYBOARD IN FRONT OF YOU, YOU WILL NOTICE THAT THE KEYS ARE DIFFERENT COLORS. THIS ONE IS RED, THIS ONE BLUE, THIS ONE IS YELLOW, AND THIS ONE GREEN (pointing). YOU ARE TO PRESS DOWN ON THE KEY THAT HAS THE SAME COLOR AS THE COLOR YOU THINK OF WHEN YOU LOOK AT THE PICTURE. FOR EXAMPLE, WHAT COLOR DOES THIS MAKE YOU THINK OF?

Flash on first figure-red circle. If the child says "red", ask which key he would press. When he presses the key say:

THAT IS THE BELL WHICH MEANS THAT YOU GOT THE RIGHT ANSWER. TRY ANOTHER KEY AND SEE WHAT HAPPENS WHEN YOU GET THE WRONG ANSWER.

After the subject does this, say:

THAT IS THE BUZZER, WHICH MEANS YOU GOT THE WRONG ANSWER. THIS WAY YOU WILL KNOW EACH TIME WHETHER YOU ARE RIGHT OR WRONG, BUT FOR EACH DESIGN YOU MAY PRESS ONLY ONE KEY. IF YOU MAKE A MISTAKE WE WILL GO RIGHT ON TO THE NEXT ONE. LET'S TRY SOME OF THESE.

After the first subtest, say:

THAT COMPLETES THE FIRST GROUP OF PICTURES. NOW WE ARE GOING TO START THE NEXT GROUP. YOU WILL HAVE TO TRY TO FIGURE OUT THE RIGHT REASON FOR PICKING ONE KEY OR ANOTHER. IF YOU ARE ABLE TO FIGURE OUT THE REASON WHY YOUR ANSWERS ARE RIGHT OR WRONG IT WILL HELP, BECAUSE THE REASON STAYS THE SAME ALL THE WAY THROUGH THE GROUP.

Proceed with the second subtest. Any part of the instructions may be repeated at any time, but the subject should never be told the principle. The examiner should be alert to notice what parts of the instructions need repetition. Children frequently need to be reminded to try to figure out the reason for their choices, rather than to make only haphazard responses. When a subject has difficulty with the test he should be asked to describe stimulus figures before responding, to recall what items had been presented previously, to watch how the pictures change from one to the next, and to try to figure out the reason why one system or another might be correct.

NOW WE ARE GOING TO START THE THIRD GROUP. THIS GROUP MAY BE DIFFERENT FROM THE ONE YOU JUST FINISHED OR IT MAY BE THE SAME. LET'S SEE IF YOU CAN FIGURE OUT THE RIGHT ANSWERS.

Proceed with the fourth subtest using the same type of introductory comments as with the third subtest. Before beginning the fifth subtest, say:

NOW WE ARE GOING TO START THE LAST GROUP. THIS GROUP WILL TEST YOUR MEMORY SINCE IT IS MADE UP OF PICTURES THAT YOU HAVE ALREADY SEEN. TRY TO REMEMBER WHAT THE RIGHT ANSWER WAS THE FIRST TIME YOU SAW THE PICTURE AND GIVE THE SAME ANSWER AGAIN.

Do not hesitate to comment favorably at any time during the test when the subject answers correctly.

SCORE: Total number of errors.

Although there is a standard set of slides for children which we are using, several other innovations are being tried. For example, besides different stimulus figures to test reversal and non-reversal shift learning ability, we are color-coding the four quadrouts of each page of the Peabody Picture Vocabulary Test to explore its possibilities as a testing-teaching-testing sequence; we are not teaching to the test but with the test itself or some modification thereof.

II. TACTUAL PERFORMANCE TEST

Since we are placing considerable emphasis on the development of senses and perceptions as well as the reduction of response time on various tasks, this technique allows us to appraise a child's progress in this area. It is a somewhat modified Sequin Formboard which has been mounted at an angle of approximately 60 degrees from the horizontal; there are two forms which differ in complexity and the number of wooden objects to be placed in their respective non-interchangeable locations. This instrument is compatible to several similarly-conceived Montessori pieces of equipment which we employ as additional autotelic activities -- thus we get some feedback on their efficacy through pre-program--post-program test--re-test evidence. The following directions should clarify some of the unclear details.

Directions for Administration of the Tactual Performance Test

Blindfold the child before putting blocks and board on table. The board is so placed that the cross is in the upper left-hand corner. While putting out blocks and board say:

ON THE TABLE IN FRONT OF YOU I AM PUTTING OUT A BOARD. THE BOARD IS SITTING ON A STAND SO THAT IT WILL BE UPRIGHT AND WILL NOT FALL OVER. ON THE BOARD ARE SPACES OF VARIOUS SIZES AND SHAPES. ON THE TABLE I AM PUTTING OUT BLOCKS OF VARIOUS SIZES AND SHAPES. THE BLOCKS WILL FIT INTO THE SPACES ON THE BOARD. THERE IS A BLOCK FOR EACH SPACE AND A SPACE FOR EACH BLOCK. WHEN YOU HAVE PLACED THE BLOCK IN ITS PROPER SPACE, IT WILL FIT AND WILL NOT FALL OUT.

After the board and blocks are out, say:

THIS IS WHAT THE BOARD FEELS LIKE. HERE IS ONE SIDE, HERE IS THE TOP, AND HERE IS THE OTHER SIDE (run patient's hand around board). YOU CAN FEEL THE STAND UP HERE AT THE TOP, BUT I WANT YOU TO PAY ATTENTION ONLY TO THE BOARD AND BLOCKS. AS YOU RUN YOUR HAND OVER THE BOARD YOU CAN FEEL THE VARIOUS SPACES. (Run child's hand quickly over entire board). HERE ARE THE BLOCKS ON THE TABLE IN FRONT OF YOU. (Run child's hand over blocks). NOW USING ONLY YOUR RIGHT (or left) HAND (always have child use preferred hand) I WANT YOU TO FIT THE BLOCKS INTO THEIR PROPER SPACES ON THE BOARD. DO YOU HAVE ANY QUESTIONS? REMEMBER TO DO IT AS QUICKLY AS YOU CAN. ALL RIGHT--READY, BEGIN. (Start timing.)

Immediately after child has finished the task with his preferred hand, say:

THAT WAS THE LAST BLOCK THAT YOU JUST PUT IN. NOW I WOULD LIKE YOU TO DO THE SAME THING OVER AGAIN, BUT THIS TIME USING ONLY YOUR LEFT (or right--non preferred) HAND.

Quickly show the child the shape of the board again and remind him that it is the same board and same blocks. He is just to do it again as quickly as possible but using only his left hand.

After he has completed the task with his left hand, take out blocks and have him do it a third time using both hands.

After the third trial, remove blocks and board before unblindfolding child, and say:

NOW I WOULD LIKE YOU TO DRAW A PICTURE OF THE BOARD THAT YOU WERE JUST WORKING WITH. FIRST DRAW AN OUTLINE OF THE SHAPE OF THE BOARD (not the stand just the board) THEN DRAW IN AS MANY OF THE BLOCKS AS YOU CAN REMEMBER. TRY TO PUT THEM IN YOUR DRAWING WHERE YOU THINK THEY WERE ON THE BOARD. IF YOU REMEMBER A BLOCK BUT DON'T REMEMBER WHERE IT GOES, PUT IT IN ANYWHERE.

SCORE" Time--Time for each performance recorded individually and totaled.

Memory--Number of correct shapes included in the drawing.

Localization--Number of shapes approximately correctly localized (within the correct quadrant and not seriously out of relationship to other shapes) in the drawing.

III. AUDITORY DISCRIMINATION TEST

In order to train and assess perceptual acuity we have used many approaches. The Bell and Howell Language Master has been mentioned in the body of this report. Moreover, page 2 of Appendix B describes one way in which it is employed in a problem-solving situation.

Our head teacher and assistants have captured a number of commonplace sounds on Language-Master cards and we have selected several of the more representative ones for use in an evaluation of auditory discrimination. A flushing toilet, a passing car, crashing blocks, running water (into

empty metal pan or bowl full of water), a squealing guinea pig, etc., are the kinds of sounds we find meaningful in this kind of episode. There are, of course, numerous variations on this and some enjoyable group games have also been devised using this technique.

CONCLUSION

Obviously, we are simply on the frontier of developing kaleidoscope varieties of new appraisal devices and procedures. We are gathering data constantly and as we analyze parts of it, we refine our techniques and/or instruments. We are sure we have several very promising approaches, but feel obligated to subject them to more vigorous and prolonged empirical validation and correlational studies (for predictive and concurrent validity) before freezing and standardizing them on large samples.